

CLAIMS

1. A bifurcated stent comprising:

a first stent body, the first stent body comprising a substantially tubular stent wall having a circumferential plane, the first stent body being expandable from an unexpanded state to an expanded state, in the expanded state the first stent body defining a primary flow path open at both ends; and

5 a plurality of members moveably engaged to the stent wall, in the unexpanded state the plurality of members being retained substantially within the circumferential plane of the stent wall, in the expanded state the plurality of members being extended radially outward from the first stent body to form a scaffold, the scaffold defining a side opening in the stent wall, in the expanded state the scaffold defining a secondary flow path, the secondary flow path being in fluid communication with the primary flow path.

10 2. The bifurcated stent of claim 1 wherein the first stent body is characterized as being self-expandable, balloon expandable or hybrid expandable.

15 3. The bifurcated stent of claim 1 wherein the plurality of members are characterized as being self-expandable, balloon expandable or hybrid expandable.

20 4. The bifurcated stent of claim 1 wherein the first stent body is characterized as being substantially balloon expandable and the plurality of members are characterized as being substantially self-expandable.

25 5. The bifurcated stent of claim 1 wherein the bifurcated stent is at least partially constructed from a shape-memory material.

6. The bifurcated stent of claim 1 wherein the plurality of members are at least partially constructed from a selectively annealed metal.

7. The bifurcated stent of claim 6 wherein the plurality of members are at least partially constructed from a selectively annealed shape-memory metal.

8. The bifurcated stent of claim 1 further comprising a second stent body, the second stent body having an unexpanded state and an expanded state, in the unexpanded state the second stent body constructed and arranged to be advanced through the side opening defined by the scaffold of the expanded first stent body, in the expanded state the second stent body being positioned adjacent to the first stent body, an end of the second stent body being engaged by the scaffold, in the expanded state the second stent body further defining the secondary flow path.

9. The bifurcated stent of claim 8 wherein the second stent body is characterized as being self-expandable, balloon expandable or hybrid expandable.

10. The bifurcated stent of claim 1 in combination with a balloon, the balloon comprising:  
a balloon body, the balloon body being expandable from a unexpanded configuration to an expanded configuration, the balloon body constructed and arranged to be positioned within the first stent body, when the balloon body is expanded to the expanded configuration the first stent body is expanded to the expanded state, in the expanded configuration the balloon having a bulge region, the bulge region constructed and arranged to engage the plurality of members and to at least partially extend radially outward from the circumferential plane of the stent wall when in the expanded configuration.

11. The combination of claim 10 wherein the bulge region of the balloon is constructed and arranged to expand from the unexpanded configuration to the expanded configuration subsequent to the balloon body.

12. The combination of claim 10 wherein the bulge region comprises a portion of the balloon body having a greater thickness than the rest of the balloon body.

13. The combination of claim 10 wherein the balloon comprises at least a portion of a  
5 stent delivery catheter.

14. A bifurcated stent assembly comprising:  
a first stent body, the first stent body comprising a substantially tubular stent wall having a circumferential plane, the first stent body being expandable from an  
10 unexpanded state to an expanded state, in the expanded state the first stent body defining a primary flow path open at both ends;  
a plurality of members moveably engaged to the stent wall, in the unexpanded state the plurality of members being retained substantially within the circumferential plane of the stent wall, in the expanded state the plurality of members being extended radially  
15 outward from the first stent body to form a scaffold, the scaffold defining a side opening in the stent wall; and  
a second stent body, the second stent body having an unexpanded state and an expanded state, in the unexpanded state the second stent body constructed and arranged to be advanced through the side opening defined by the scaffold of the expanded first stent body,  
20 in the expanded state the second stent body being positioned adjacent to the first stent body, an end of the second stent body being engaged by the scaffold, in the expanded state the scaffold and the second stent body defining a secondary flow path, the secondary flow path being in fluid communication with the primary flow path.

25 15. The system of claim 14 wherein the first stent body is characterized as being self-expandable, balloon expandable or hybrid expandable.

16. The system of claim 14 wherein the plurality of members are characterized as being self-expandable, balloon expandable or hybrid expandable.

17. A system for deploying a bifurcated stent assembly to a bifurcation site, the system comprising:

a first catheter, the catheter being adapted for insertion into a body vessel and advancement to a bifurcation site along a primary guide wire, the catheter having at least one  
5 stent retaining region for retaining a first stent body in an unexpanded state thereon, the first stent body comprising a substantially tubular stent wall having a circumferential plane, the first stent body being expandable from an unexpanded state to an expanded state, and a plurality of members moveably engaged to the stent wall, in the unexpanded state the plurality of members being retained substantially within the circumferential plane of the  
10 stent wall, in the expanded state the plurality of members being extended radially outward from the first stent body to form a scaffold, the scaffold defining a side opening in the stent wall.

18. The system of claim 17 wherein the first stent body is characterized as being self-

15 expandable, balloon expandable or hybrid expandable.

19. The system of claim 17 wherein the plurality of members are characterized as being self-expandable, balloon expandable or hybrid expandable.

20. The stent delivery system of claim 17 further comprising a second catheter, the second catheter being advanced to the bifurcation site along a secondary guide wire, the secondary guide wire, constructed and arranged to be inserted through the first stent body and through the side opening, the second catheter having a second stent retaining region for retaining a second stent body in an unexpanded state thereabout, the second stent body  
25 constructed and arranged to be expanded from the unexpanded state to an expanded state, in the expanded state the second stent body being positioned adjacent to the first stent body, an end of the second stent body being engaged by the scaffold.

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21. The stent delivery system of claim 17 wherein the first stent body is characterized as having a proximal portion and a distal portion, the first stent body constructed and arranged to be inserted around a contra lateral wall of the bifurcation site such that the distal portion extends from a primary vessel of the bifurcation site into a secondary vessel of the

5 bifurcation site, the proximal portion of the first stent body constructed and arranged to be positioned proximal to a carina of the bifurcation, the side opening of the first stent body constructed and arranged to be positioned adjacent to the carina of the bifurcation site such that the scaffold extends into the primary vessel adjacent to the carina.

10 22. The stent delivery of claim 21 further comprising a second catheter, the second catheter being advanced to the bifurcation site along a secondary guide wire, the secondary guide wire constructed and arranged to be guide the second catheter through the proximal portion of the first stent body and through the side opening and at least partially into the primary vessel distal of the carina of the bifurcation site, the second catheter having a second

15 stent retaining region for retaining a second stent body in an unexpanded state thereabout, the second stent body constructed and arranged to be expanded from the unexpanded state to an expanded state, in the expanded state at least a portion of the second stent body being positioned adjacent to the first stent body in the primary vessel distal of the carina, an end of the second stent body being engaged by the scaffold.

20 23. The stent delivery system of claim 22 wherein in the expanded state a first portion of the second stent body is positioned adjacent to the first stent body in the primary vessel distal of the carina and a second portion of the second stent body is positioned proximally adjacent to the first stent body in the primary vessel.

25 24. The stent delivery system of claim 23 wherein the first portion and the second portion of the second stent body are engaged to one another.

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25. The stent delivery system of claim 23 wherein the first portion and the second portion of the second stent body are separated from one another.

26. The stent delivery system of claim 22 further comprising at least one radiopaque marker.

5 27. The stent delivery system of claim 26 wherein the at least one radiopaque marker is positioned on the first stent body.

10 28. The stent delivery system of claim 27 wherein the at least one radiopaque marker is positioned on between the proximal portion and distal portion of the first stent body.

29. The stent delivery system of claim 26 wherein the at least one radiopaque marker is a portion of the first stent body.

15 30. The stent delivery system of claim 28 wherein the at least one radiopaque marker further comprises a second radiopaque marker, the second radiopaque marker being positioned on the second stent body.

20 31. The stent delivery system of claim 30 wherein the second radiopaque marker is positioned on the end of the second stent body.

32. The stent delivery system of claim 22 wherein at least one of the first stent body and second stent body is balloon expandable, self-expandable, or hybrid expandable.

25 33. The stent delivery system of claim 32 wherein the at least one stent mounting region of the first catheter comprises a balloon, the balloon constructed and arranged to expand the first stent body from the unexpanded state to the expanded state the balloon comprising:  
a balloon body, the balloon body being expandable from a unexpanded

configuration to an expanded configuration, when the balloon body is expanded to the expanded configuration the first stent body is expanded to the expanded state, in the expanded configuration the balloon having a bulge region, the bulge region constructed and arranged to engage the plurality of members and to at least partially extend radially

5 outward from the circumferential plane of the stent wall when in the expanded configuration.

34. The stent delivery system of claim 32 wherein the second stent mounting region of the second catheter comprises a balloon, the balloon constructed and arranged to expand the second stent body from the unexpanded state to the expanded state.

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35. The stent delivery system of claim 17 wherein the at least one stent mounting region comprises a first stent mounting region and a second stent mounting region, the first stent mounting region being positioned distally from the second stent mounting region, the first stent mounting region being constructed and arranged to retain the first stent body in the

15 unexpanded state thereon, the second stent mounting region constructed and arranged to retain a second stent body in an unexpanded state thereon.

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36. The stent delivery system of claim 35, the first catheter is constructed and arranged to deliver the first stent body to the bifurcation site such that the first stent body is positioned at least partially across an ostium of a secondary vessel, such that when the first stent body is in the expanded state the scaffold extends into the secondary vessel.

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37. The stent delivery system of claim 36, wherein following delivery of the first stent body the primary guide wire and first catheter are constructed and arranged to be withdrawn from the first stent body and reinserted through the side opening of the first stent body into the secondary vessel.

38. The stent delivery system of claim 37 wherein the first catheter is further constructed and arranged to deliver the second stent body in the expanded state to a position in the

secondary vessel adjacent to the side opening of the first stent body, such that an end of the second stent body is engaged by the scaffold.

39. The stent delivery system of claim 17 wherein at least a portion of the first stent body is

5 constructed from a shape-memory material.

40. The stent delivery system of claim 17 wherein at least a portion of the first stent body

is constructed from a metal selected from the group consisting of stainless steel, nitinol,

Elgiloy, shape-memory material, and any combination thereof.

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